MITSUBISHI

UNINTERRUPTIBLE POWER SUPPLY
7011A SERIES UPS

SINGLE PHASE PRODUCT
  6kVA
  8kVA
  10kVA
  12kVA

OWNERS / TECHNICAL MANUAL

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Preface
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HOW TO USE THIS MANUAL

This manual is designed for ease of use, giving the user easy and quick reference to information. This manual uses notice icons to draw attention to the user important information regarding the safe operation and installation of the UPS. The notice icons used in this manual are explained below, and should be taken into account and adhered to whenever they appear in the text of this manual.

**WARNING:** A warning notice icon conveys information provided to protect the user and service personnel against hazards and/or possible equipment damage.

**CAUTION:** A caution notice icon conveys information provided to protect the user and service personnel against possible equipment damage.

**NOTE:** A Note notice icon indicates when the user should make a reference of information regarding the UPS operation, load status and display status. Such information is essential if Mitsubishi field service group assistance and correspondence is required.

**Safety Recommendations:** If any problems are encountered while following this manual, Mitsubishi field service group assistance and correspondence is recommended.
SAFETY PRECAUTIONS

The safety precautions are categorized as **DANGER** and **CAUTION** in this instruction manual.

**DANGER**: A dangerous situation may occur if improperly handled, leading to severe or fatal injuries.

**CAUTION**: A dangerous situation may occur if improperly handled, leading to minor serious injuries.

Note that some items described as **CAUTION** may lead to severe results depending on the situation. Nonetheless, important information outlined in this section must be observed at all times.

<table>
<thead>
<tr>
<th>DANGER</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Do not dispose of the batteries in a fire as they may explode.</strong></td>
</tr>
<tr>
<td><strong>Do not open or break the batteries. Released electrolyte is toxic and harmful to the eyes and skin.</strong></td>
</tr>
<tr>
<td><strong>A battery can present a risk of electrical shock and high short circuit current.</strong></td>
</tr>
</tbody>
</table>

Observe the following minimum Safety Precautions when working on the batteries.

1. Verify that the UPS is off and that the input power plug or wires are disconnected.
2. Remove watches, rings or other metal objects.
3. Use tools with insulated handles to prevent inadvertent shorts.
4. Wear rubber gloves and boots.
5. Do not lay tools or metal parts on top of the batteries.
6. Determine if the battery is inadvertently grounded. If so, remove source of ground. Contact with any part of a grounded battery can result in electrical shock. The likelihood of such shock will be reduced if grounds are removed during installation and maintenance.
CAUTION

PRECAUTIONS FOR INSTALLATION
• Do not block the intake/exhaust ports. Install the UPS at least 4” (10cm) away from walls, etc.
  -If the intake/exhaust ports are blocked, the internal temperature of the UPS will rise and could lead to fires from battery electrolyte leakage, fire ignition or part deterioration.
• Follow the UPS instruction manual carefully when installing the unit.
  -Improper installation could lead to injury such as the UPS falling over, etc.

PRECAUTIONS FOR WIRING
• The power supply for this unit must be single phase rated in accordance with the equipment data plate. It must be suitably grounded.
  -Failure to ground the unit could lead to electrical shocks.

PRECAUTIONS FOR USE
• If a unit fault, abnormal odor or noise occurs, turn off the UPS input switch.
  -Failure to do so could lead to fires.
• Do not insert blunt objects or fingers, etc., in the fan.
  -Failure to observe this could lead to injuries.
• Do not insert blunt objects or fingers, etc., into the unit's input/output section.
  -Failure to observe this could lead to electrical shocks.
• Ventilate the UPS surroundings.
  -Failure to do so could lead to container rupture or to explosions from the gas generated from the battery system.
• Prohibit smoking and the use of fire around the unit.
  -Failure to do so could lead to injuries, damage or fires from explosions.
• Do not place containers that have water or any liquids on the UPS.
  -If the container tips over and the water or liquids spills, this could lead to electrical shocks and to fires in the UPS.
• Do not sit on, step on or lean on the UPS.
  -Failure to observe this could lead to injuries if the UPS tips over.
CAUTION

PRECAUTIONS FOR MAINTENANCE AND INSPECTION

- The inside of the UPS must be inspected or repaired only by qualified personnel.
  - Failure to observe this could lead to electrical shocks, injuries, burns, smoke generation or fires.
- Periodically replace the battery (every 5 years).
  - Batteries that have exceeded the replacement life could lead to fires from electrolyte leakage or fire ignition.
- Contact the dealer or service company for unit maintenance and repairs, and for the replacement of defective parts.
  - Opening the cover could lead to electrical shocks or burns.

PRECAUTIONS FOR BATTERY

- If the battery ignites, do not use water to extinguish the fire. Instead, use a powder (ABC) fire extinguisher.
  - Use of water could cause the fire to grow.
- Toxic diluted sulfuric acid in the battery.
  - If electrolyte leaks from the unit, avoid contact with the skin or clothes.
    If electrolyte makes contact with the skin or clothes, wash it off thoroughly with clean water.
    If electrolyte makes contact with the eyes, rinse immediately and thoroughly with clean water, and then see a doctor. The presence of sulfuric acid in the eyes could lead to blindness, and adherence to skin could lead to burns.

OTHER PRECAUTIONS

- Never use or store the unit in the following types of environment:
  a) A location having a low or high temperature, or high humidity deviated from the ambient environment conditions described in the brochure or instruction manual.
  b) A location submerged in water or where the unit could become wet from dripping water.
  c) At an altitude higher than 5000 feet (1500 meters).
  d) In direct sunlight.
  e) Where organic solvents (gasoline, paint thinner, etc.) are stored.
  f) A location that is dusty.
  g) A location containing combustible gas, corrosive gas, salt or oil mist.
  h) A location subject to vibration or impacts.
  i) A location near devices that generate sparks or near heating elements.
1.0 INTRODUCTION

The Mitsubishi Uninterruptible Power Supply (UPS) is designed to provide many years of reliable power supply and protection from power failure, brown-outs, line noise, and voltage transients. To ensure optimum performance of the equipment, follow the manufacturer's instructions accordingly. This manual contains descriptions for the installation and operation procedures of the UPS. Please read this manual carefully and retain it for future reference.

This manual contains important instructions for the 7011A Series Uninterruptible Power Supply Systems that should be adhered to during installation, operation and maintenance of the UPS and batteries.

Lethal voltages exist within the equipment during operation. Observe all warning and cautions in this manual. Failure to comply may result in serious injury or death. Obtain a qualified service for this equipment as per instructions.
This UPS does not include an AC input circuit breaker (MCCB) to protect the bypass and main input circuit. The AC input circuit breaker (MCCB) is to be field supplied and installed. Circuit breaker (MCCB) specifications are as follows:

<table>
<thead>
<tr>
<th>Capacity (kVA)</th>
<th>AC input Voltage (Vac)</th>
<th>AC input Rating (Aac)</th>
<th>Recommended Breaker (A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>208</td>
<td>26.4</td>
<td>35</td>
</tr>
<tr>
<td>8</td>
<td>208</td>
<td>35.2</td>
<td>45</td>
</tr>
<tr>
<td>10</td>
<td>208</td>
<td>44.0</td>
<td>60</td>
</tr>
<tr>
<td>12</td>
<td>208</td>
<td>52.8</td>
<td>70</td>
</tr>
</tbody>
</table>

AC output and DC input overcurrent protection and disconnection devices shall be field supplied and installed.
1.1 GENERAL

The Mitsubishi 7011A Series UPS is designed to provide continuous and clean electrical power to a critical load. In the event of an input power failure, the UPS will supply power to the critical load for the specified battery time.

If the input power is not restored promptly, backup power from the UPS battery permits the orderly shutdown of equipment supported by the UPS. The UPS is simple to start up, operate and maintain.

The 7011A Series UPS is available in four (4) kVA sizes: 6, 8, 10 and 12kVA. Specifications for each kVA model appear in Section 1.4. All models have batteries included in the UPS module cabinet. The principles of operation described herein are applicable to all models.

This manual provides an overview of the 7011A Series components and their functions. The appearance and purpose of operator controls and indicators is described with procedures for operation, start-up, shutdown and basic maintenance included.
1.2 DEFINITIONS

UNINTERRUPTIBLE POWER SUPPLY SYSTEM (UPS) - All components within the UPS Module Cabinet and associated batteries which function as a system to provide continuous, conditioned AC power to a load. This is sometimes referred to as the "System".

UPS MODULE CABINET - The metal enclosure which contains Converter & Inverter Module, I/O Module, batteries, and operator controls required to provide specified AC power to a load.

_converter & inverter module_ - The Converter / Charger and Inverter assembly which, under the direction of the I/O Module and operator controls, provide specified AC power to a load.

_I/O MODULE_ – Assembly which contains Static Transfer Switch, the internal bypass line, and the internal control system. With operator controls, gives directions required to the Converter & Inverter Module to provide specified AC power to a load.

_converter / charger_ - The UPS component which contain the equipment and controls necessary to convert input AC power to regulated DC power required for battery charging and for supplying power to the Inverter.

_inverter_ – The UPS component which contain the equipment and controls necessary to convert DC power from the Converter / Charger, or the battery, to AC power required by the critical load.

_static transfer switch_ - Device which connects critical load to the bypass line when the Inverter cannot supply continuous power.

_maintenance bypass line_ - Line which conducts electricity directly from the input power source to the critical load during maintenance or whenever the UPS is not completely operational.

_ac input power_ - Power provided by the electrical utility company, or auxiliary generator, which is connected to the UPS for supplying critical load and recharging the battery.

_battery_ - Rechargeable battery strings which supply DC power to the inverter to maintain continuous AC power to the load during AC input power failure conditions.
1.3 OVERVIEW

The UPS provides two power paths between the utility source and the critical load. Figure 1.1 shows the path for normal operation, with the load powered from the inverter. Figure 1.2 shows the path for bypass operation, with the load supplied through the static bypass line.

**FIGURE 1.1** Single Line Diagram - Normal Operation. Load powered by inverter.

During normal operation, the path through the inverter is used to power the load.

Referring to Figure 1.1: Input AC power is converted to DC by the Converter. DC power is utilized to charge the UPS battery and to provide power to the Inverter. The Inverter converts the DC power to clean AC power to supply the critical load.

The conversion - inversion process eliminates any voltage transients or fluctuations existing in the input power before it reaches the critical load.

* The Input circuit breaker(MCCB) for protection of the UPS and cables are field supplied and field installed. (See WARNING 2 in section 1.0).
Referring to Figure 1.2, the Internal Static Bypass line is a hard-wired line which supplies the critical load with unconditioned input power. The purpose of this line is to route power to the critical load while the UPS module is de-energized (converter and inverter), and during Start-up before the system is fully operational.

The internal control system determines the operation of the two paths, with the load powered from the inverter being the normal operation.

Referring to Figure 1.3, if the input power is interrupted, the battery will immediately supply the DC power required by the Inverter to maintain continuous AC power to the load. A fully charged battery will provide power for the specified time at the rated load, or longer at reduced load.

When power is restored after a low battery shutdown, the Converter automatically restarts operation, recharges the batteries and the Inverter is automatically restarted without operator intervention. The load is assumed by the inverter automatically without operator intervention.

In the event of a power failure, the Converter will de-energize and the batteries will discharge into the Inverter and maintain power to the critical load until a) the battery capacity expires and the inverter turns off, or b) input power is restored after which the converter will power the inverter and simultaneously recharge the batteries. Figure 1.3 illustrates the flow diagram during battery operation.
The UPS is equipped with an internal rotary type Maintenance Bypass Switch (MBS) that can be used to divert utility power to the load during maintenance sessions. Figure 1.4 illustrates the power path when the MBS is in the BYPASS mode.
The rotary maintenance bypass switch is shown as 52CS in Figure 1.4. 52CS is a two position four point make-before-break transfer switch.

The two positions are identified as NORMAL and BYPASS. In the NORMAL position the load is fed by the UPS - either through the inverter or through the static bypass line. In the BYPASS position the load is powered by an external source such as the utility or a generator. This transfer operation must be made while the UPS is in the static bypass mode.

For transfer procedure to place the UPS in maintenance bypass mode, or from bypass mode to normal operation mode, refer to section 3.6 Maintenance Bypass Set-up Procedures.

(For Service Personnel Only)
FIGURE 1.6 UPS Parts Location (8, 10 and 12kVA)

1. Relay I/F PCB RYER-A
2. Maintenance bypass transfer switch 52CS
3. Module Connection terminal
4. Cooling fan
5. Battery

UPS module
FRONT VIEW

Main PCB UPFR-L
Display PCB DPAU-63
Converter & Inverter
I/O Module
FIGURE 1.7 UPS Parts Location (Rear view)

- Main control PCB UPFR-L
- 1. External I/F PCB RYER-A
- AC Output terminal
- AC Input terminal
- 5. Field Wire Terminal Block
- 6. Grounding Bar
- External battery terminal
- 4. External battery terminal

FIGURE 1.8 External I/F PCB RYER-A

- 9. External contact signal terminal block
- 8. D-sub25Pin Connector
- 7. RS232C D-sub Connector

Note: Connection
Description of UPS parts, referred to in Figure 1.5 to Figure 1.8:

1. Relay PCB RYER-A board
   Signal I/F on RYER-A board: (Figure 1.8):
   - (7) RS232C communication connector
   - (8) D-Sub 25 Pin connector
   - (9) External contact signal terminal block

2. Maintenance Bypass Switch (52CS) (FOR SERVICE PERSONNEL ONLY)
   This switch is used to transfer the load from inverter power to external power for maintenance purposes. Do not operate it under normal operation.

3. Module Connection terminal (FOR SERVICE PERSONNEL ONLY)
   Terminal block to connect each module.

4. External Battery terminal (FOR SERVICE PERSONNEL ONLY)
   Terminal block to connect the external battery cabinet.

5. Field Wire Terminal Block (FOR SERVICE PERSONNEL ONLY)
   Refer to Figure 3.3 and Figure 3.4 for details

6. Grounding Bar

7. RS232C connector
   Refer to Figure 2.8 for detail.

8. D-Sub 25 Pin connector
   Refer to Table 2.1 for detail.

9. External Contact Signal Terminal Block
   Terminal block to connect contact signal input/output lines to and from external dry contacts. Refer to Table 2.2 for details.
1.4 SPECIFICATIONS

The UPS name plate displays the rated kVA as well as nominal voltages and currents. The name plate is located on the interior side of the UPS front door.

**TABLE 1.1 Power Specifications**

<table>
<thead>
<tr>
<th>Rated output Power</th>
<th>Input voltage 1 ph 3 wire or 2 ph 3 wire</th>
<th>Output voltage 1 ph 3 wire or 2 ph 3 wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>6kVA / 4.2kW</td>
<td>240/120, 208/120</td>
<td>240/120, 208/120</td>
</tr>
<tr>
<td>8kVA / 5.6kW</td>
<td>240/120, 208/120</td>
<td>240/120, 208/120</td>
</tr>
<tr>
<td>10kVA / 7.0kW</td>
<td>240/120, 208/120</td>
<td>240/120, 208/120</td>
</tr>
<tr>
<td>12kVA / 8.4kW</td>
<td>240/120, 208/120</td>
<td>240/120, 208/120</td>
</tr>
</tbody>
</table>

**TABLE 1.2 UPS Module Information**

<table>
<thead>
<tr>
<th>UPS (kVA)</th>
<th>CABLE ENTRY</th>
<th>WIDTH (in/mm)</th>
<th>DEPTH (in/mm)</th>
<th>HEIGHT (in/mm)</th>
<th>WEIGHT* (lb./kg)</th>
<th>HEAT LOSS @ 208V (kBTU/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>REAR</td>
<td>13.8 / 350</td>
<td>29.9 / 760</td>
<td>27.8 / 705</td>
<td>307/140</td>
<td>2.2</td>
</tr>
<tr>
<td>8</td>
<td>REAR</td>
<td>13.8 / 350</td>
<td>29.9 / 760</td>
<td>40.6 / 1030</td>
<td>507/230</td>
<td>2.9</td>
</tr>
<tr>
<td>10</td>
<td>REAR</td>
<td>13.8 / 350</td>
<td>29.9 / 760</td>
<td>40.6 / 1030</td>
<td>507/230</td>
<td>3.6</td>
</tr>
<tr>
<td>12</td>
<td>REAR</td>
<td>13.8 / 350</td>
<td>29.9 / 760</td>
<td>40.6 / 1030</td>
<td>507/230</td>
<td>4.3</td>
</tr>
</tbody>
</table>

*Including batteries

**TABLE 1.3 Rating of Contactors and Fuses**

<table>
<thead>
<tr>
<th>Component(s)</th>
<th>Description</th>
<th>Component Rating @ 208V, 3 phase, 60 Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>CB1</td>
<td>AC Input Contactor</td>
<td>80A/80A/80A</td>
</tr>
<tr>
<td>CB2</td>
<td>DC Input Contactor</td>
<td>32A/60A/60A</td>
</tr>
<tr>
<td>FCR, FCS</td>
<td>AC Input Fuse</td>
<td>80A/240V/80A</td>
</tr>
<tr>
<td>FIU, FIV</td>
<td>Inverter Output Fuse</td>
<td>80A/240V/80A</td>
</tr>
<tr>
<td>FUBU, FUBV</td>
<td></td>
<td>30A/600V/30A</td>
</tr>
<tr>
<td>FD1, FD3</td>
<td>UMAR-A</td>
<td>40A/660V/80A</td>
</tr>
<tr>
<td>FD2</td>
<td>UMAR-A</td>
<td>80A/500Vdc/80A</td>
</tr>
</tbody>
</table>
### TABLE 1.4  Detail of Specifications

<table>
<thead>
<tr>
<th>Rated Output kVA</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated Output kW</td>
<td>4.2</td>
<td>5.6</td>
<td>7.0</td>
<td>8.4</td>
</tr>
</tbody>
</table>

### AC INPUT CHARACTERISTICS

- **Configuration**: 1 phase 3 wire or 2 phase 3 wire
- **Voltage**: 240/120V (1 phase), 208/120V (2 phase)
- **Frequency**: 50 / 60 Hz +/-5%
- **Reflected Current THD**: 4% typ. at 100% load; 7% typ. at 50% load

### BATTERY

<table>
<thead>
<tr>
<th>Type</th>
<th>VRLA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ride Through</td>
<td>10min. at 100% load</td>
</tr>
<tr>
<td>Nominal Voltage</td>
<td>216 Vdc</td>
</tr>
<tr>
<td>Minimum Voltage</td>
<td>173 Vdc</td>
</tr>
<tr>
<td>Number of Cells</td>
<td>108</td>
</tr>
</tbody>
</table>

### AC OUTPUT

- **Configuration**: 1 phase 3 wire or 2 phase 3 wire
- **Voltage**: 240/120V (1 phase), 208/120V (2 phase)
- **Voltage Stability**: +/-2% steady state
- **Frequency**: 50 / 60 Hz
- **Frequency Stability**: +/-0.01% in free running mode
- **Power Factor**: 0.7 nominal
- **Power Factor range**: 0.7 ~ 1.0 lagging (within output kW rating)
- **Voltage THD**: 2% typical THD at 100% Linear Load
- **Transient Response**: +/-3% typical at 100% load step
- **Voltage Unbalance**: 2% typical at 100% unbalanced load
- **Phase Displacement**: 1deg. typical at 100% load
- **Inverter Overload**: 150% for 1 minute
- **System Overload**: 150% for 1 minute, 1000% for 1 cycle (with bypass available)
- **Bypass Overload**: 150% for 1 minute, 1000% for 1 cycle
- **Crest Factor Capabilities**: 3:1

### ENVIRONMENTAL

- **Cooling**: Forced Air
- **Operating Temperature**: 32°F ~ 104°F (0°C ~ 40°C). Recommended 59°F ~ 77°F (15°C ~ 25°C)
- **Relative Humidity**: 5% ~ 95% Non Condensing
- **Altitude**: 0 ~ 9000 feet No Derating
- **Location**: Temperature-controlled, indoor area free of conductive contaminants
2.0 OPERATOR CONTROLS AND INDICATORS

The 7011A Series operator controls and indicators are located as follows:

- Maintenance bypass switch and contactors: Inside the unit
- UPS status indicators: Door exterior

**FIGURE 2.1** Operation/Display Panel (Front panel)
2.1 STATUS INDICATORS

1) Load on inverter [INV OP.] (green)
   Illuminated when power is supplied from inverter to the critical load.

2) [UPS] (green)
   Illuminated when UPS is ready to supply load.

3) Load on bypass [BYP OP.] (yellow)
   Illuminated when power is supplied to load devices by static bypass.

4) Battery operation [BAT OP.] (yellow)
   Illuminated when the battery is operating following an AC power failure.

5) [ALARM] (red)
   Illuminated when UPS is in fault mode, input abnormal, or overload.

6) Liquid Crystal Display (LCD)
   During operation, LCD displays as shown in figure 2.2.
   For details of LCD displays, refer to “2.2 LCD DISPLAY”.

   FIGURE 2.2 LCD Display During Normal Operation
   ![LCD Display During Normal Operation](image)
   When UPS is operating normally, LCD shows output voltage, frequency, and amount of battery left.

   ![Failure Display](image)
   When there’s a failure in the UPS, LCD shows the display on the left.

   ![Event Code Display](image)
   When there’s a failure in the UPS resulting from false operation such as overload, LCD shows code no. and status of the failure.

7) Menu [MENU] (gray)
   When pressed, displays NORMAL MODE Menu Window on the LCD. When pressed simultaneously with ENTER key (1 sec.), will display USER SETUP MODE Menu Window.

8) Clear [CLEAR] (gray)
   When pressed, will return to the upper level window on the LCD.

9) Up/Down [▲ ▼] (gray)
   When pressed, will select the previous/next choice, or decrease/increase the number of the chosen status on the LCD.
10) **Enter [ENTER] (gray)**
   When pressed, will fix the displayed value, and/or display the next window.

11) **UPS start [START] (green)**
   UPS start button. When pressed, the UPS starts to load from the inverter.

12) **UPS stop [STOP] (red)**
   UPS stop button. When pressed, the UPS can be stopped.
   When pressed, will display Stop Mode Window. Then if pressed simultaneously with
   ENTER button, the UPS will stop operation.
2.2 LCD DISPLAY

Followings are tree diagrams of LCD display.

A) Top Page

FIGURE 2.3 Tree Diagram of LCD display (Top Page)

OUT: 120V 60.0Hz
BATTERY: ■■■■

FAILURE PRESS MENU->LOG
EVENT CODE 806
OVERLOAD

MENU key
MENU & ENTER key (1sec)
CLEAR key or
MENU & CLEAR key (Jump up)

START key
CLEAR key

STOP key
CLEAR key

Normal Mode
See Fig 2.4
User Setup Mode
See Fig 2.5
Start Mode
See Fig 2.6
Stop Mode
See Fig 2.7
B) Normal Mode

**FIGURE 2.4** Tree Diagram of LCD Display (Normal Mode)

<table>
<thead>
<tr>
<th>Measure</th>
<th>OUT1:</th>
<th>L1-N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>OUT2:</td>
<td>L2-N</td>
</tr>
<tr>
<td>Log</td>
<td>+[code]:</td>
<td>Occurred</td>
</tr>
<tr>
<td></td>
<td>- [code]:</td>
<td>Cleared</td>
</tr>
<tr>
<td>Set up</td>
<td>BATT_CHK</td>
<td>Start the self battery test operation.</td>
</tr>
<tr>
<td></td>
<td>TIME</td>
<td>Set the day and time.</td>
</tr>
<tr>
<td></td>
<td>VOLT_ADJ:</td>
<td>Adjust the output voltage.</td>
</tr>
<tr>
<td></td>
<td>SCROLL:</td>
<td>Set the log page scroll speed.</td>
</tr>
<tr>
<td></td>
<td>BYPASS_OP:</td>
<td>Select the output source.</td>
</tr>
</tbody>
</table>
C) User Setup Mode

**FIGURE 2.5** Tree diagram of LCD Display (User Setup Mode)

- **ALARM**: Audible alarm Enable / Disable
- **RESET**: Fault clear and restart.
- **STOP_SET**: Stop mode select (Output Stop or Bypass Transfer)

**D) Start Mode**

**FIGURE 2.6** Tree Diagram of LCD Display (Start Mode)

- **Start(When UPS is INV.OP.)**: LOAD ON INVERTER
- **Start(Bypass Asynchronous)**: LOAD INTERRUPT? YES
- **Start(When initializing)**: TRY AGAIN AFTER CHECKING LOG

**E) Stop Mode**

**FIGURE 2.7** Tree Diagram of LCD Display (Stop Mode)

- **Stop(Bypass Synchronous)**: STOP PRESS STOP & ENTER KEY
- **Stop(Bypass Asynchronous)**: BYPASS ABNORMAL UNABLE TO STOP
- **Stop(When UPS is BYP.OP.)**: LOAD ON BYPASS
- **Complete Shutdown**: STOP+UP+ DOWN key (5sec) INTERRUPT TRANS? YES

---

When “Complete Shutdown” procedure is executed, all the output power from the UPS will be shut off.
2.3 RS232C CONNECTOR (External communication connector)

This is an RS232C port for “Diamond-Link”* monitoring software. The layout of the connector is shown in Figure 2.8. Connections not to exceed NEC Class 2.

* Consult MITSUBISHI ELECTRIC AUTOMATION, INC. for detail on “Diamond Link” monitoring software and its capabilities.
2.4 D-SUB 25 PIN CONNECTOR

Uses dry contact on/off to express NORMAL, FAULT, ON BATTERY, BATTERY LOW, ON BYPASS, ON INVERTER status. Connections not to exceed NEC Class 2.

**TABLE 2.1 D-Sub 25 Pin connector**

<table>
<thead>
<tr>
<th>Pin No.</th>
<th>Signal</th>
<th>I/O</th>
<th>Pin No.</th>
<th>Signal</th>
<th>I/O</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Failure A Contact</td>
<td>Output</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Failure A Contact com</td>
<td>Output</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Output</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Battery Operation A Contact</td>
<td>Output</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Battery Operation com</td>
<td>Output</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Output</td>
<td>19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Battery Low Voltage A Contact</td>
<td>Output</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Battery Low Voltage A Contact com</td>
<td>Output</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Bypass Operation A Contact</td>
<td>Output</td>
<td>22</td>
<td>Shut Off</td>
<td>Input</td>
</tr>
<tr>
<td>10</td>
<td>Bypass Operation A Contact com</td>
<td>Output</td>
<td>23</td>
<td>Shut Off common</td>
<td>Input</td>
</tr>
<tr>
<td>11</td>
<td>Inverter Operation A Contact</td>
<td>Output</td>
<td>24</td>
<td>RE-EPO</td>
<td>Input</td>
</tr>
<tr>
<td>12</td>
<td>Inverter Operation A Contact com</td>
<td>Output</td>
<td>25</td>
<td>RE-EPO common</td>
<td>Input</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td>Output</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**FIGURE 2.10 D-sub 25 Pin Connectors**

(User supplied)
2.5 EXTERNAL SIGNAL TERMINAL BLOCK (Option)

The UPS is equipped with a series of input/output terminals for the external annunciation of alarms and the remote access of certain UPS functions. A functional description of the input/output port is presented below. Layout of terminals is shown in Figure 2.10. Connections not to exceed NEC Class 2.

**FIGURE 2.11** External Signal Terminal Block

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 2</td>
<td>FAILURE</td>
</tr>
<tr>
<td>3 - 4</td>
<td>REMOTE EPO</td>
</tr>
<tr>
<td>5 - 6</td>
<td>RE-STARTUP</td>
</tr>
<tr>
<td>7 - 8</td>
<td>RE-SHUTDOWN</td>
</tr>
<tr>
<td>9 - 10</td>
<td>BATTERY TEMPERATURE</td>
</tr>
</tbody>
</table>

(User supplied dry contact)
A) Output Contacts (for external alarm annunciation)
Output contacts consist of form “A” dry type contacts. Rated capacity of all output contacts is 30Vdc/1Adc. Operate all dry contacts at their rated values or lower. Figure 2.11 illustrates typical installation. The external relay can also be a lamp, LED, computer, etc.

**FIGURE 2.12** Control Wiring for External Contacts

NOTE: The UPS is equipped with a selectable output contact feature. The above alarms are the default settings. Contact MITSUBISHI ELECTRIC AUTOMATION, INC. for setup information.
B) Input Contacts (for remote access of UPS)

External contacts are provided by the user of the UPS system. Terminal voltage at the UPS is 24Vdc. Provide external dry contact accordingly.

**CAUTION:** Do not apply voltage to remote access input terminals. Damage to UPS may result.

Refer to Figure 2.12 for typical wiring configuration. Although this figure applies to the RE-STARTUP terminals, the same wiring arrangement is used for RE-EPO; RE-SHUTDOWN, Battery temperature.

**FIGURE 2.13** Remote "Startup" Contact Connections

![Diagram of Remote "Startup" Contact Connections]

**NOTE:** In all cases, a switch having a protective cover is recommended in order to reduce possibility of accidental operation.
3.0 INSTALLATION AND OPERATION

3.1 TRANSPORTATION AND INSTALLATION

**TABLE 3.1** How to transport and install the system

<table>
<thead>
<tr>
<th>Transportation</th>
<th>Installation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transport unit with forklift.</td>
<td>Pull out the UPS cabinet as shown in Figure 3.1</td>
</tr>
<tr>
<td></td>
<td>Fix the UPS unit in place using the four (4) leveling feet</td>
</tr>
</tbody>
</table>

**NOTE:** Do not transport in a horizontal position. Cabinets should be maintained upright within +/- 15° of the vertical during handling.

3.2 HANDLING

The UPS is shipped in export packaging. Remove the UPS from the package only when it is ready for installation. Refer to Figure 3.1 for handling.
3.3 INSTALLATION PROCEDURE

A) **Note the load tolerance of the floor**

Refer to TABLE 3.1 for list of UPS weights:

<table>
<thead>
<tr>
<th>UPS Capacity (kVA)</th>
<th>6</th>
<th>8</th>
<th>10</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (lb.)</td>
<td>307</td>
<td>507</td>
<td>507</td>
<td>507</td>
</tr>
</tbody>
</table>

B) **Minimum clearance required for ventilation**

- Right side ........ 1.2" (30 mm) (not required when sidecars are used)
- Left side .......... 1.2" (30 mm) (not required when sidecars are used)
- Back side .......... 3.9" (100 mm)
- Top side .......... 23.5" (600 mm)

C) **Space requirement for routine maintenance**

Allow for the following space at the time of installation.

- Front ............... 39.2" (1000 mm)
- Sides ............... 1.2" (30 mm)
- Rear ............... 39.2" (1000 mm)

(3.9" (100mm) when cable connected at the rear side is drawn from the front side)

**FIGURE 3.1** Clearance for ventilation and maintenance
3.3 PROCEDURE FOR CABLE CONNECTION (Refer to Table 3.2 for cable sizes.)

1) Confirm the capacity of the UPS being installed. Identify the field terminal blocks as shown in the appropriate Figure 3.2 or Figure 3.3-Figure 3.5.

2) Referring to Figure 3.4-Figure 3.5., connect the grounding conductors from the input service entrance to the UPS ground bar.

3) Confirm that an external input circuit breaker sized to protect both the rectifier input and the bypass lines is installed. Consult equipment nameplate for current ratings.

4) Connect the AC power source cables from the input service entrance to the UPS" INPUT power terminals identified as L1, N, and L2 in Figure 3.3-Figure 3.5. Input cables must be sized for an ampere rating larger than the maximum current capacity of the UPS. Refer to Table 3.2 for recommended cable sizes.

5) Refer to Table 3.2 for recommended cable sizes. Referring to Figure 3.3-Figure 3.5, connect UPS OUTPUT load terminals L1, N, and L2 to load distribution panel.

6) UPS equipment does not employ AC output overcurrent protection or disconnection devices and must be provided at installation.

7) UPS equipment does not employ DC input overcurrent protection or disconnection devices and must be provided at installation.

8) Connect external signal terminal block as needed. Refer to section 2.3 and Figure 2.9 for functional description. 12 AWG or less, shielded conductor is recommended.

9) Connect external Battery
   Refer section 3.4.1.

10) Connect internal battery connector(s).

   **CAUTION:** UPS power terminals are supplied with stud type fittings. It is recommended that compression lugs be used to fasten all input/output power cables. Refer to Table 3.3 for recommended compression lugs and appropriate crimping tool.
TABLE 3.2 Recommended Cable Size and Torque Requirements

<table>
<thead>
<tr>
<th>UPS Capacity (kVA)</th>
<th>Input Side *1</th>
<th>Output Side *1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cable Size</td>
<td>Torque (in. lbs)</td>
</tr>
<tr>
<td>6kVA (208V)</td>
<td>10 AWG *2 or larger</td>
<td>80 in. lbs</td>
</tr>
<tr>
<td>8kVA (208V)</td>
<td>8 AWG *2 or larger</td>
<td>80 in. lbs</td>
</tr>
<tr>
<td>10kVA (208V)</td>
<td>6 AWG *2 or larger</td>
<td>80 in. lbs</td>
</tr>
<tr>
<td>12kVA (208V)</td>
<td>6 AWG *2 or larger</td>
<td>80 in. lbs</td>
</tr>
</tbody>
</table>

*1 - Voltage drop across power cables not to exceed 3% of nominal source voltage.
*2 - Allowable ampere ratings based on 90 °C insulation at an ambient temperature of 40 °C.

No more than 3 conductors in a raceway without de-rating. Use copper conductors rated 90°C.

TABLE 3.3 Crimp Type Compression Lug

<table>
<thead>
<tr>
<th>Wire Size (Code)</th>
<th>Wire Strand Class</th>
<th>Recommendation</th>
<th>Crimp tool required</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>B</td>
<td>BURNDY YAV10 T3BOX</td>
<td>BUNRNDY type Y35 or Y46</td>
</tr>
<tr>
<td>8</td>
<td>B</td>
<td>BURNDY YA8C-L BOX BLUE</td>
<td>RED 49</td>
</tr>
<tr>
<td>6</td>
<td>B</td>
<td>BURNDY YA6C-L BOX BLUE</td>
<td>7 / 374</td>
</tr>
</tbody>
</table>

**NOTE:** When using crimp type lugs, the lugs should be crimped to the specifications given in the manufacturer's instructions for both crimp tool and lug.

FIGURE 3.2 UPS Terminal Designation
FIGURE 3.3 Terminal Block

<table>
<thead>
<tr>
<th>DC INPUT</th>
<th>GROUND</th>
<th>AC OUTPUT</th>
<th>AC INPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-</td>
<td>B+</td>
<td>L1</td>
<td>L1</td>
</tr>
<tr>
<td>G</td>
<td></td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>L2</td>
<td></td>
<td>L2</td>
<td>L2</td>
</tr>
</tbody>
</table>

- B-: DC Input
- B+: DC Input
- G: Ground
- L1: AC Output
- L2: AC Output
- N: AC Input

216Vdc

Use for External Battery

FIGURE 3.4 Field Wire Terminal Block (6kVA) (Rear View)

- 7. RS232C
- 9. External Signal Terminal Block (Optional: Cover Plate when not in use)
- 8. D-sub25Pin Connector
- Rectifier/Inverter Module

I/O Module

5. Field Wire Terminal Block

ALL POWER TERMINALS
USE 1/4” (6 MM) DIAMETER BOLTS

6. Grounding Bar
FIGURE 3.5 Field Wire Terminal Block (8, 10 and 12kVA) (Rear View)

7. RS232C

9. External Signal Terminal Block (Optional: Cover Plate when not in use)

8. D-sub25Pin Connector

Rectifier/Inverter Module

Rectifier/Inverter Module

I/O Module

5. Field Wire Terminal Block

ALL POWER TERMINALS USE 1/4” (6 MM) DIAMETER BOLTS

6. Grounding Bar
FIGURE 3.6 Field Wire Connection (208V – 120V WYE, 2 phase, 3wire)

**NOTE:** Proper phase rotation must be observed when connecting input wires to L1 and L2.

*If code 803 occurs*

See next page.

---

**Utility Power**

208V-120VY

---

**External Battery Cabinet (If used)**

---

**UPS Cabinet**

---

**Recommend Circuit Breaker**

---

**Neutral Bus bar**

---

*1 : Please refer to the page 3-10*
Wire Connection (208V – 120V WYE, 2 phase, 3wire)

UPS Must have Clockwise Phase Rotation if Error code 803 occurs, swap L1 and L2. (see figure 3.6.1 and 3.6.2)

**FIGURE 3.6.1 Correct connection**

**FIGURE 3.6.2 Incorrect connection**

-> Code 803 Displayed on LCD when UPS powered up.
FIGURE 3.7 Field Wire Connection (240V – 120V, 1 phase, 3wire)

Utility Power

External Battery Cabinet (If used)

UPS Cabinet

240V-120V

Ground

Recommend Circuit Breaker

Neutral Bus bar

*1 : Please refer to the page 3-10
3.4 INSTALLATION PROCEDURE FOR BATTERY

Installation procedures of the batteries are shown on the next page.

Please refer to the following when installing and maintaining batteries:

1. Servicing of batteries should be performed or supervised by personnel knowledgeable of batteries and the required precautions. Keep unauthorized personnel away from batteries.

2. When installing or replacing batteries, install or replace with the same number and type per Table 3.4

**TABLE 3.4 Type and Number of Battery**

<table>
<thead>
<tr>
<th>Type</th>
<th>Manufacturer</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6kVA</td>
<td>HV7-12</td>
<td>Shin-Kobe</td>
</tr>
<tr>
<td>8,10 and 12kVA</td>
<td>HV7-12</td>
<td>Shin-Kobe</td>
</tr>
</tbody>
</table>

**CAUTION**
- Do not dispose of battery or batteries in a fire. The battery may explode.

**CAUTION**
- Do not open or mutilate the battery or batteries. Released electrolyte is harmful to the skin and eyes and may be toxic.

**CAUTION**
- A battery can present a risk of electrical shock and high short circuit current. The following precautions should be observed when working on batteries:
  - Remove watches, rings, or other metal objects.
  - Use tools with insulated handles.
  - Wear rubber gloves and boots.
  - Do not lay tools or metal parts on top of batteries.
  - Disconnect charging source prior to connecting or disconnecting battery terminals.
3.4.1 PROCEDURE FOR EXTERNAL BATTERY CONNECTION (OPTIONAL)

1. Installation procedure
   Please refer to the figure 3.6 or 3.7 for connection.
   Must connect external battery before internal battery is connected.

2. Set-up procedure
   Please confirm the capacity “Ah (ampere hour)” of the external battery cabinet.
   Refer to the Page 3-16 for the Ah (ampere hour) setup on the UPS.
3.4.2 PROCEDURE FOR INTERNAL BATTERY CONNECTION

Procedures for battery connection are as follows.
Please note, these procedures **must be performed after** the external cables are connected. For procedures for external cable connection, please refer to “3.3 PROCEDURE FOR CABLE CONNECTIONS”.

1. Remove the straps, which hold the batteries.
2. As shown in the left figure, when shipped, there are unconnected connectors for safety. Connect these unconnected connectors.

![battery connection diagram]

**FIGURE 3.8** Battery Connection when shipped

For your safety, one side of the connectors is not connected when shipped.
Connection of the battery module connectors may apply voltage to B+ / B- connectors on the Field Wire Terminal Block on the rear side of the UPS.

**Please be sure to connect the external cables before connecting the battery connectors.**
3.5 OPERATING PROCEDURES

A) UPS Initial Startup Procedure

Please be sure to confirm the internal maintenance bypass switch 52CS on “NORMAL” position before turn on AC input power.

This procedure is only performed during initial start-up.

AC Input power ON

UPS START? YES

Select YES.

HOUR : MINUTE 17 : 28

Select HOUR and MINUTE.

MONTH/DAY / YEAR 10 / 14 / 00

Select MONTH, DATE, and YEAR.

OUT: 120V 60.0Hz BATTERY: √√√√√

UPS Normal operation.

B) UPS Start-up Procedure

1. Press and Hold “START” button for 0.5 seconds
2. The “INV.OP.” LED illuminates and the Inverter starts.

C) Bypass Operation Procedure

1. Press “MENU” button and then select “BYPASS_OP.” and press ENTER button.
2. Press “▲” or “▼” until the display shows “YES”, and then press ENTER button.
3. “BYP.OP.” LED illuminates and the UPS will be in bypass operation.

WARNING: Verify the load is OFF if the next step is to be performed.

NOTE: Power to the critical load is supplied through the static bypass line. Power to the critical load will be lost after execution of the next step. The load will drop.
4. If turning off all power to the critical load is desired, open the AC Input Circuit Breaker (User supplied.).

**CAUTION:** In bypass mode, all UPS power terminals are still alive. Lethal voltages are present. De-energize all external sources of AC and DC power before handling UPS.

D) UPS Shutdown Procedure

1. If a total UPS module (inverter and rectifier) shutdown is required, press the "STOP" button on the front panel.
2. Then STOP Mode window will appear on the LCD.
3. Press the “STOP” and “ENTER” buttons simultaneously.
4. The UPS will shutdown and no power is supplied to the load.

**WARNING:** With this operation, although all output power from the UPS is shutdown, it is necessary to manually open the input circuit breaker (user supplied), to remove the input power to the UPS.
3.6 MAINTENANCE BYPASS SET-UP PROCEDURES

(For Service Personnel Only)

A) Transfer of load from inverter to maintenance bypass

1. Press “MENU” button and then select “BYPASS_OP.” and press ENTER button.
2. Press “▲” or “▼” until the display shows “YES”, and then press ENTER button.
3. “BYP.OP.” LED illuminates and the UPS will be in bypass operation.

**WARNING:** Do not transfer to Maintenance Bypass Mode unless the inverter is not running --- that is the UPS is in Static Bypass Mode.

4. After confirming that the “BYP.OP.” LED is illuminated, rotate 52CS clockwise to the “TRANSFER” position (Do not rotate 52CS if the “BYP.OP.” LED is NOT illuminated).
5. Then rotate 52CS clockwise to the “WAIT” position and after that push & rotate to the “BYPASS” position.
6. Transfer complete. Load is now powered from the external source.

B) Transfer of load from maintenance bypass to inverter

1. Rotate 52CS counterclockwise from the “BYPASS” position to the “WAIT” position, and wait 10 seconds until the LCD on the front panel displays the top page.

**WARNING:** Do not proceed to the next step until the LCD on the front panel displays the top page.

2. After confirming that the LCD on the front panel displays the top page, pull & rotate 52CS counterclockwise to the “TRANSFER” position, and then rotate to the “NORMAL” position.
3. On the UPS, press and hold the “START” button for 0.5 seconds. The “INV.OP.” LED should illuminate.
4. Transfer complete. Load now powered by the inverter.
3.7 EXTERNAL BATTERY SET-UP PROCEDURES

Please confirm the capacity of the external batteries. Press “MENU”, ‘ ’ and ‘ ’ buttons simultaneously for 3 seconds then Release.

```
ENTER PIN 0***
- INCORRECT -

“Press ENTER”

SETUP

“Press ENTER”

1.LOG CLEAR
NO

“Press ENTER”

2.BATTERY Ah
14 -> 28Ah

“Press ENTER”

3.BYP.SYNC.RANGE
3 -> 5%

“Press CLEAR”

SETUP

Press “CLEAR”

Top Page
```

Adjust Ah of the external battery. Ah : Capacity of external battery. (Ampere hour)
4.0 RESPONSE TO UPS FAILURE

Press the “MENU” button on the front panel. Then select “SILENCE” and press the “ENTER” button.

Select “LOG” on the front panel and press “ENTER” button. Record fault code on a piece of paper. Refer to the list of fault codes for a description of the error. See section 6 for fault codes.

Take necessary action per the list of fault codes in section 6 of this manual.

If Service is needed contact the Authorized Mitsubishi Service Representative or call Mitsubishi at: 1-800-887-7830.

NOTE

The error code indicated on the LCD at the time of UPS alarm condition is very important. In order to minimize repair time, please include this information along with the operation status and load status, on all correspondence with Mitsubishi’s field service group.
5.0 PARTS REPLACEMENT

Contact Mitsubishi or its Authorized Service Center on all issues regarding the replacement of parts.

A) Battery

Battery lifetime may vary according to the frequency of use and the average ambient operating temperature. Battery end of life is defined as the state of charge resulting in an ampere-hour capacity less than, or equal to, 80% of nominal capacity. Replace battery if capacity is within this percentage.

B) UPS Component Parts

Contact Mitsubishi or its Authorized Service Center for a complete parts replacement schedule. Recommended replacement time interval varies with operating environment. Contact Mitsubishi or its Authorized Service Center for specific application recommendations.
6.0 FAULT CODES

This section covers the fault codes, their description and required action.

At time of error:

A) Verify and record the occurrence of the alarm. Note fault code on the LCD.

Contact Mitsubishi Electric Automation, Inc. at 1-800-887-7830.

B) If the External AC Input Circuit Breaker (MCCB) is in the trip state, depress the toggle to reset the breaker before re-closing.
## TABLE 6.1 Failure Code List

<table>
<thead>
<tr>
<th>Failure Code</th>
<th>Status</th>
<th>Guidance</th>
<th>Note 1</th>
<th>Note 2</th>
<th>Note 3</th>
<th>Note 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>003</td>
<td>Pre-charge abnormal</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>061</td>
<td>Converter1 control abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>062</td>
<td>Converter2 control abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>063</td>
<td>Converter3 control abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>064</td>
<td>Converter4 control abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>102</td>
<td>DC overvoltage</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>103</td>
<td>DC undervoltage</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>109</td>
<td>DC voltage balance abnormal</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>151</td>
<td>Float voltage abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>.</td>
<td>[4]</td>
</tr>
<tr>
<td>156</td>
<td>Battery temperature abnormal CB2OFF.</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>157</td>
<td>Battery temperature abnormal</td>
<td>Check battery</td>
<td>Minor</td>
<td>Flicker</td>
<td>.</td>
<td>[4]</td>
</tr>
<tr>
<td>161</td>
<td>Float voltage abnormal (CB2 OFF)</td>
<td>Check battery</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>162</td>
<td>Battery circuit abnormal</td>
<td>-</td>
<td>-</td>
<td>Flicker</td>
<td>.</td>
<td>[3]</td>
</tr>
<tr>
<td>201</td>
<td>Output overvoltage</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>202</td>
<td>Output undervoltage</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>218</td>
<td>Inverter voltage DC component increase</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>219</td>
<td>Converter abnormal</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>261</td>
<td>Inverter1 control abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>262</td>
<td>Inverter2 control abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>263</td>
<td>Inverter3 control abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>264</td>
<td>Inverter4 control abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>271</td>
<td>Inverter1 overcurrent</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>272</td>
<td>Inverter2 overcurrent</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>273</td>
<td>Inverter3 overcurrent</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>274</td>
<td>Inverter4 overcurrent</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>281</td>
<td>Unit1 Heat sink temperature abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>282</td>
<td>Unit2 Heat sink temperature abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>283</td>
<td>Unit3 Heat sink temperature abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>284</td>
<td>Unit4 Heat sink temperature abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>302</td>
<td>CPU abnormal</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>310</td>
<td>Control circuit abnormal</td>
<td>Call service engineer</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>403</td>
<td>Recurrent Automatic Transfer</td>
<td>Reduce load</td>
<td>Major</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>Failure Code</td>
<td>Status</td>
<td>Guidance</td>
<td>Note 1 Level</td>
<td>Note 2 Failure LED</td>
<td>Note 3 Buzzer</td>
<td>Note 4 Event Log</td>
</tr>
<tr>
<td>--------------</td>
<td>---------------------------------------------</td>
<td>---------------------</td>
<td>--------------</td>
<td>--------------------</td>
<td>---------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>454</td>
<td>Module temperature high</td>
<td>Reduce room temperature</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[4]</td>
</tr>
<tr>
<td>455</td>
<td>Bypass circuit abnormal</td>
<td>Call service engineer</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>456</td>
<td>Bypass Overload</td>
<td>Reduce load</td>
<td>Minor</td>
<td>Flicker</td>
<td>[1]</td>
<td>[3]</td>
</tr>
<tr>
<td>801</td>
<td>Input power source abnormal</td>
<td>-</td>
<td>Alarm</td>
<td>Flicker</td>
<td>[1]</td>
<td>[4]</td>
</tr>
<tr>
<td>803</td>
<td>Input wire connection abnormal</td>
<td>Swap L1 and L2</td>
<td>Alarm</td>
<td>Lit On</td>
<td>[2]</td>
<td>[3]</td>
</tr>
<tr>
<td>806</td>
<td>Overload status</td>
<td>Check load</td>
<td>Alarm</td>
<td>Flicker</td>
<td>[1]</td>
<td>[4]</td>
</tr>
<tr>
<td>807</td>
<td>OverKW</td>
<td>Check load</td>
<td>Alarm</td>
<td>Flicker</td>
<td>[1]</td>
<td>[4]</td>
</tr>
<tr>
<td>808</td>
<td>Overload warning</td>
<td>Reduce load</td>
<td>Alarm</td>
<td>Flicker</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>809</td>
<td>OverKW warning</td>
<td>Reduce load</td>
<td>Alarm</td>
<td>Flicker</td>
<td>.</td>
<td></td>
</tr>
<tr>
<td>810</td>
<td>Instant overload</td>
<td>-</td>
<td>Alarm</td>
<td>.</td>
<td>.</td>
<td>[3]</td>
</tr>
</tbody>
</table>
| 812          | Input voltage abnormal  
     +/- 10% deviation  
     or (energy conservation setting +/- 25% deviation) | -                   | Alarm        | .                  | .             | [4]             |
| 814          | Input frequency abnormal (Due to setting)   | Check input frequency | Alarm        | Flicker            | .             | [4]             |
| 817          | EPO                                         | -                   | Alarm        | Flicker            | .             | [3]             |
| 834          | Battery depleted                            | -                   | Alarm        | Flicker            | .             | [3]             |
| 835          | Battery deplete warning                     | Reduce load         | Alarm        | Flicker            | .             |                 |
| 837          | Unit quantity mismatch                      | Call service engineer | Alarm        | Flicker            | [1]           | .               |

Note 1) Level

* "Major" is defined as a major failure. Load transferred from inverter to the static bypass line.
* "Minor" is defined as a minor failure. UPS continues to operate normally, but cause of alarm must be identified.

Note 2) Failure LED

Indicates one of two possible LED illumination patterns - continuously on (lit) or intermittent (flicker).

Note 3) Buzzer (Audible annunciator)

[1]: Intermittent Sound  
[2]: Continuous Sound

Note 4) Event log In case of major failures, log 10 items after the failure.

[3]: Log time and item name at occasion. In some case, isn't logged.
[4]: Log time and item name at occasion and clearing.
7.0 WARRANTY & OUT OF WARRANTY SERVICE

The Mitsubishi Electric UPS Systems Group Service Department has many Authorized Service Centers placed strategically throughout the US, Canada and Latin America. For both in warranty and out of warranty service, please contact Mitsubishi Electric Automation, Inc. at (847) 478-2643. To register your UPS for warranty purposes, please complete the warranty registration form and fax it to the Mitsubishi Electric UPS Systems Group, Service Department fax line shown on the registration form. (Next page)

For warranty purposes, it is essential that any and all service work that may be required on your Mitsubishi brand UPS equipment is performed by a Mitsubishi Electric Authorized Service Center. The use of non-authorized service providers may void your warranty.

Mitsubishi Electric Automation Inc,
UPS Systems Group Service Department

500 Corporate Woods Parkway,
Vernon Hills, Illinois 60061, USA
Phone: (847) 478-2643
Fax: (847) 478-2290
UPS Warranty Registration

__ Register UPS for Warranty          ___ Address Change

To validate the Warranty on your UPS this form must be filled out completely by Customer and returned.

<table>
<thead>
<tr>
<th>CUSTOMER INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Your Name:</td>
</tr>
<tr>
<td>Company Name:</td>
</tr>
<tr>
<td>Division / Department:</td>
</tr>
<tr>
<td>Address:</td>
</tr>
<tr>
<td>City:</td>
</tr>
<tr>
<td>Country:</td>
</tr>
<tr>
<td>Business Phone:</td>
</tr>
<tr>
<td>E-Mail:</td>
</tr>
<tr>
<td>UPS Model #:</td>
</tr>
<tr>
<td>Start-Up Date:</td>
</tr>
<tr>
<td>Signature:</td>
</tr>
</tbody>
</table>

Which ONE of These Best Describes Your Organization’s Primary Business Classification?

(Manufacturing Co.)
- Utility
- Alternate Energy
- OEM
- Process
- Consumer Goods
- Electronics
- Power Quality Equipment
- Commercial Business
- Electrical Contractor
- Healthcare
- Internet
- Education/Univ. Service

(Service)
- Consulting
- Engineering
- Outsourcing
- Financial/Legal/Insurance
- Military
- Municipal
- Federal/State/Local
- Communications
- Distributors/Reps
- Other

Number of Employees at This Location is:
- 1 – 19
- 100 – 249
- 1000 or more
- 20 – 49
- 250 - 499
- 50 – 99
- 500 - 999

Overall how was Start-Up performed:
- Unsatisfactory
- Satisfactory
- Exceeded Expectations

Would you like to receive future product updates and news?
- Yes
- No

After Start-Up has been done Fax completed Form to:
(847) 478-2290